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MILK-BOTTLE LOSSES AND WAYS TO REDUCE THEM

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INTRODUCTION

The replacement of lost and broken bottles is an item of great importance to all market-milk dealers. According to the Census of Manufactures for 1935, of the United States Department of Commerce, there were manufactured in that year 305,837,712 milk bottles, valued at $10,980,124, f. o. b. factory prices. Most of these bottles undoubtedly were used by the milk dealers to replace lost or broken bottles. As the above cost is for prices f. o. b. manufacturing plant, the total cost to the dealers for bottles to replace wastage must have been considerably greater than this amount.

Various methods are used by milk dealers in an attempt to reduce the breakage in the plant and to effect the return of bottles from the home and store trade. Special attention was given to the breakage of bottles in the plant in a previous publication.[1] Many dealers have been able greatly to reduce their losses from this source. This has been brought about by such measures as impressing on the plant employees the importance of preventing breakage and of handling the bottles carefully (in some cases the pay of the employee is affected by the amount of breakage charged to him), attention in keeping the bottle cases in good repair, more efficient control of temperatures during washing, more efficient conveyors, and more efficient arrangement of the plants.

This circular gives information on the life of bottles, the various plans or systems used by dealers to get bottles returned from the

[1] Clement, C. E., Bain, J. B., and Grant, F. M. Effect of plant arrangement, equipment, and operation in relation to breakage of bottles in milk plants. U. S. Dept. Agr. Tech. Bull. 280, 29 pp., illus. 1932.

routes, on the organization, management, equipment, and operation of milk-bottle exchanges for collecting, cleaning, and returning lost bottles, and on methods for preventing the misuse of milk bottles, cans, and crates.

LIFE OF THE BOTTLE

A tabulation of the reports from 111 milk dealers on the life of the bottle at their plants showed the following results for all plants:

	Trips
Average	34. 58
Range	6–91
Median	29
Mode or most common	28

The frequency distribution of the number of trips made per bottle, ranging from less than 10 to more than 90 trips, as obtained at these plants, is given in table 1. It will be seen that by far the most common group had an average of between 20 and 30 trips. Fifty-seven plants obtained a life of less than 30 trips. Only 21 plants obtained a life of 50 trips or more, and only 4 plants a life of 70 trips or more.

TABLE 1.—*Frequency distribution of the life of the bottle when plants are grouped according to an average bottle life of less than 10 to more than 90 trips*

Range (trips)	Plants		Range (trips)	Plants	
	Number	*Percent*		*Number*	*Percent*
0 to 9.9	1	0. 90	60 to 69.9	6	5. 41
10 to 19.9	16	14. 41	70 to 79.9	1	. 90
20 to 29.9	40	36. 04	80 to 89.9	1	. 90
30 to 39.9	16	14. 41	90 to 99.9	2	1. 80
40 to 49.9	17	15. 32			
50 to 59.9	11	9. 91	Total	111	100. 00

CLASSIFICATION BY SIZES

The data obtained from 54 dealers gave the life of the bottle by sizes at their plants (table 2). The averages are higher than those obtained from 111 plants (table 1). This better showing apparently was due to the fact that although fewer plants reported the life of the bottle by sizes they included a larger proportion of the plants that held the driver responsible for all bottles (p. 6).

TABLE 2.—*Life of bottles classified by sizes, at 54 plants as indicated by number of trips made*

Item	Trips made by—			
	All sizes	Quart bottles	Pint bottles	½-pint jars
	Number	*Number*	*Number*	*Number*
Average	37. 41	39. 25	40. 36	37. 06
Range	[1] 6–91	6–88	7–245	8–98
Median	31. 09	32. 79	30. 00	31. 75

[1] Shows range between plant with lowest and plant with highest average number of trips for all sizes.

There was only a slight difference in the averages for the quart and for the pint bottles. Large numbers of pint bottles of milk are drunk at factories and on construction jobs, etc. Many of these bottles are

lost and broken, because customers do not make any effort to return them unless a charge is made for the bottle. Proportionately more quart than pint bottles, however, are broken in the plants. In a study it was found that more quart bottles than pint bottles were broken per 1,000 of each handled, at 72.4 percent of 69 plants, and more quart bottles were broken per 1,000 handled than either pint bottles or ½-pint jars at 47.8 percent of the plants.[2] Usually a quart bottle will break more easily under the same blow than a pint bottle, and a pint bottle will break more easily than a ½-pint jar. The jars, however, are usually subjected to more severe blows in the various plant operations, so that proportionately more of them are broken than of the pint bottle. More ½-pint jars than pint bottles were broken in proportion to the number handled at 60.8 percent of the 69 plants mentioned above. Furthermore, more ½-pint jars may be taken for making preserves in the home than either of the other two sizes. The fact that the average life of the ½-pint jars was slightly less than that of either of the other two sizes may be due in part to these causes.

The frequency distribution of the life of the bottle by sizes for 54 plants is shown in table 3. The average life for bottles of all sizes was less than 40 trips at nearly two-thirds of these plants. At three plants the average life for pint bottles only was more than 100 trips.

TABLE 3.—*Frequency distribution of the life of the bottle, classified by sizes, at 54 plants*

Range of life (trips)	Plants falling in specified range-of-life class for various sized bottles				Range of life (trips)	Plants falling in specified range-of-life class for various sized bottles			
	Bottles of all sizes	Quart bottles	Pint bottles	½-pint bottles		Bottles of all sizes	Quart bottles	Pint bottles	½-pint bottles
	Number	*Number*	*Number*	*Number*		*Number*	*Number*	*Number*	*Number*
0 to 9.9	1	1	3	2	60 to 69.9	3	4	3	3
10 to 19.9	9	4	18	9	70 to 79.9	0	2	1	2
20 to 29.9	14	16	5	13	80 to 89.9	1	3	1	0
30 to 39.9	9	14	9	11	90 to 99.9	2	0	1	3
40 to 49.9	9	3	9	3	100 to 199.9	0	0	1	0
50 to 59.9	6	7	1	8	200 to 249.9	0	0	2	0

RELATION OF METHODS USED TO GET THE BOTTLES RETURNED TO THE LIFE OF THE BOTTLE

Probably the most difficult problem with which the dealer has to contend in connection with bottle expense is to obtain the return of the bottles.

Many milk consumers have apparently not been made to understand that the milk bottle is a valuable property of the distributor and is merely loaned. Since numerous articles of food are purchased as packed in containers which then belong to the purchaser, many customers apparently think this same rule holds with milk bottles. Other milk consumers merely let the bottles accumulate in their kitchens or cellars, not throwing them away, yet making no attempt to return them. The discarding, destruction, or accumulation of milk bottles is usually the result of negligence or lack of information. Consumers must constantly be reminded of the importance of return-

[2] See footnote 1.

ing bottles to delivery men and to stores. Various methods of doing this are described on pages 16 to 20.

A survey was made of the methods used by milk dealers in various localities to effect the return of bottles, and of the life of the bottle at their plants. The systems used by various groups of plants to recover the bottles, and the average number of trips made by the bottle at these plants are shown in table 4. In some cases the same plant was used for two classifications, because data were obtained for two different years and the system had been changed meanwhile.

TABLE 4.—*Relation of the average life of the bottle at 111 plants to the systems used to get the bottles in from the routes*

Group and system used	Plants	Trips made by the bottle	
		Average	Range
	Number	*Number*	*Number*
(1) No bottle exchange, no pooling, and no special system	10	22. 58	12–28
(2) Exchange operated; no pooling or charge for bottles delivered to the home trade [1]	78	30. 24	6–64
(3) Bottles pooled and stray bottles used [2]	6	47. 32	37. 5–64
(4) All bottles charged to driver; bottles also pooled in many cases [2]	17	57. 13	30–91
All plants	111	34. 58	6–91

[1] 32 plants in this group charged for all bottles delivered to stores.
[2] All plants in group charged for all bottles delivered to stores.

The plants of the first group did not use any special system to recover the bottles from the routes, and did not operate a bottle exchange. Although one plant made a charge for bottles delivered to milk stores, this was not an important factor as the store business of this dealer was relatively small. The average life of the bottle was short.

The six plants in the third group pooled the bottles, either by use of a bottle common to all dealers or by permitting each dealer to use stray bottles. Besides pooling the bottles, all the plants in this group also made a charge for all bottles delivered to stores; the data, therefore, represent the results of a combination of the two systems. The average life of the bottle at these plants was greater than at the plants in either the first or second group. Further information on the practice of pooling is given under Pooling of Bottles.

The plants of the fourth group held the driver responsible for all bottles taken out, both for store and family deliveries, as described under Charging All Bottles to Driver. Also, the bottles were usually pooled, or a universal bottle was used for the family trade. In all cases the stores were charged for bottles, and usually the driver was also permitted to charge the family trade for bottles short, although he seldom had to do this when he informed the customer that he had to pay for shortages. The greater life of the bottle, achieved in this as compared with the other groups, appears to be due in part to the practice of charging all bottles to the driver, as well as making the store and the consumer responsible for return of the bottle.

The plants of the second group were in localities where a bottle exchange was being operated. Besides belonging to an exchange, nearly one-half of these plants charged the stores for bottles delivered to them, and at 20 of the 78 plants a commission based on the return

of bottles was paid to the drivers. The life of the bottle at these 78 plants ranged from 6 to 64 trips for different plants, the average being 30.24 trips, as compared to 22.58 at the plants which had no bottle exchange. Probably these two figures do not give a true picture of the results obtained from an efficiently managed bottle exchange, which is usually operated in conjunction with some other system for preventing loss of bottles. Some of the plants did not charge stores for bottles although doing a large trade with stores, and some of the exchanges apparently were not operated to the best advantage.

Additional information on the relative life of the bottle in localities where an exchange is operated with or without the use of a store bottle, was obtained from 65 milk-bottle exchanges. All but two stated that the life of the bottles was definitely increased by the existence of the exchange. The estimated increase for different cities varied from 5 to 100 percent in number of trips made per bottle. In general the greater life was obtained where the store bottle was used to supplement the work of the exchange in collecting bottles. The exchanges in 31 cities where the store bottle was not being used reported an average life of 21.74 trips, ranging from 4 to 36, and those in 34 cities where the store bottle was being used reported an average of 38.15 trips, ranging from 5 to 100.

Bottle exchanges and various methods used by them to increase the life of the bottle are discussed on pages12 to 31.

It is evident from the foregoing that several different systems may be in use by the same dealers or in the same locality for increasing the life of the bottle, so that it is difficult to determine the effect of any one individual practice. Also, as already stated, efficient milk-plant operation and equipment tend to increase the life of the bottle by reducing breakage.

POOLING OF BOTTLES

As shown previously, bottles were pooled and stray bottles were used at only six plants (table 4). The average life of the bottle at these plants was 47.32 trips. All the plants in this group also charged the stores for all bottles delivered to them. Usually the driver was given an incentive to bring in as many bottles as possible, either by charging him for all bottles taken out and crediting him with all bottles returned at so much each or by paying him a commission based on return of bottles. The pooling system eliminates the necessity of sorting bottles for strays at the plant, and at 1 plant operating 80 retail routes 3 men who had formerly been thus employed were dispensed with. This system also eliminates the necessity of operating a milk-bottle exchange.

If it is desired to pool all bottles and to use stray bottles, it is necessary for all the dealers in a particular locality to cooperate; and if there is a local regulation forbidding the use of stray bottles, it is necessary to get this regulation suspended.

This system encourages the drivers to pick up bottles to which they are not entitled in many cases. Furthermore, it is often difficult to get all the dealers in a locality to cooperate in such a plan.

THE ASSOCIATION BOTTLE

In a few localities where the pooling system is practiced, a universal or association bottle is used for the family as well as for the store trade. Two exchanges reported that a universal bottle was used for the family

trade by the dealers in their cities. Where this bottle is used all bottles are the same for all dealers. The bottle usually has a distinctive mark on it together with the name of the milk dealers' association, and is easily distinguished from other bottles. As a rule each dealer pays into the bottle fund an initial amount prorated in accordance with the number of bottles of milk he sells daily. One association requires members to make an initial purchase of 7 bottles for each bottle of milk sold per day to the family trade and 10 bottles for each bottle sold per day to stores handling milk. After a dealer has purchased his initial supply he can draw as many bottles as he desires from the general supply each month. The association determines at the end of the month the total cost of all bottles delivered to all the dealers and this amount is prorated among the dealers in accordance with the amount of business they do daily. However, where it happens that a dealer overdraws or underdraws his quota he is debited or credited so much per bottle for all bottles overdrawn or underdrawn. In this way each dealer pays his share of the cost of the bottles used by all dealers in proportion to the amount of business he does, and if he draws more or less than his quota of bottles from the general supply he is debited or credited for the difference.

CHARGING ALL BOTTLES TO DRIVER

At 17 plants all bottles for both the home and store trade were charged to the driver (table 4). He in turn was permitted to charge his family customers for bottle shortages if he considered it advisable. This is not often necessary, as he can usually persuade his customers to put out the bottles by impressing on them the fact that he himself is charged for all shortages. The average life of the bottle at the plants using this system was 57.13 trips, ranging from 30 to 91. At some plants the bottles were also pooled. Although this system apparently results in recovering the greatest number of bottles, it has some disadvantages. It undoubtedly encourages drivers to take bottles belonging to other drivers of the same company, and where the bottles are pooled drivers may pick up bottles belonging to other companies. To check this tendency the driver, though held responsible for all shortages of bottles, is usually not paid anything for extra bottles, any excess of bottles being credited to him against future shortages. Some consumers will object to the continued insistence of the driver that they put out the bottles and some business may be lost by this system, unless it is followed by all dealers.

THE COMMISSION SYSTEM

Many of the plants studied pay the driver a commission or bonus based on the return of bottles. The data in table 6 show that the average life of the bottle at plants using the commission system was 43.07 trips, whereas that for plants which did not pay the driver a commission was only 25.82 trips. Also, the average life of the bottle at the plants using this system was greater than at those that did not do so, both for those plants that charged the stores for bottles and for those that did not. Of course other factors may have contributed to the larger number of trips made per bottle at these plants, but the commission system was probably the principal cause.

For example, at one plant operating five routes one driver who was paid on a straight-salary basis and who was considered an efficient

man, lost as many bottles as did all the other four drivers combined, who were paid a commission based on the return of bottles.

Some of the bases adopted by various plants which used this method are shown in table 5.

TABLE 5.—*Bases used by various milk plants for commission to drivers for return of bottles*

Basis No.	Credit allowed driver for bottles returned	Charge to driver per bottle short over allowed shortage	Allowable shortage without deduction from credits or salary
1	4 cents for each bottle over allowable shortage	4 cents	150 per month.
2	2 cents each for all bottles returned	2 cents	None.
3	2 cents each for all bottles over 97 percent of number taken out.	None	No limit.
4	½ cent each for all bottles over 90 percent	½ cent	10 percent.
5	½ cent each for all bottles over 100 percent	None	No limit.
6	1 cent each for all bottles returned over 100 percent	1 cent	None.
7	¼ cent each for all quart bottles and ⅛ cent each for all pint and ½-pint bottles.	None	No limit.
8	Commission on all bottles returned above 90 percent but no commission for bottles returned above 100 percent.	do	Do.
9	Overage is carried forward as credit against future shortages.	3 cents	25 bottles a day.
10	½₀ cent for all bottles returned	None	No limit.
11	5 cents each for all bottles returned above 100 bottles over for the month.	5 cents	Driver given first load of bottles. 2 percent breakage allowed, if glass is returned.
12	Bonus of $20 every 2 weeks for 100 percent bottle return or percentage of that sum equal to percentage return.	None	See column for credit allowed.
13	Bonus of $4 per month for 100-percent bottle return (none extra for over 100 percent).	do	No bonus if bottle return is less than 100 percent.
14	Bonus of $2 per month for 98-percent return (no bonus if returns are only 97 percent).	(1)	3 percent.

[1] If shortage is over 3 percent, $2 is deducted from driver's salary.

The amounts credited or paid the driver at different plants using these various bases ranged from a fraction of a cent to 5 cents per bottle returned, usually over a number ranging from 90 to 100 percent of the number taken out but in some cases for all bottles returned. In some cases the driver was charged a similar sum for each bottle short after deducting a permissible shortage, but in one-half of the plants no charge was made for shortages. In one instance the driver was charged for bottles short above a permissible shortage, but did not receive a commission for returned bottles. Uusually a driver will work more eagerly to obtain a bonus than to avoid a penalty. Payment of a commission or bonus on bottles returned encourages him to return as many as possible, and tends to create a friendly rivalry among the drivers. Without some such incentive the driver is likely to become negligent in reminding his customers to set out all empty bottles and in going out of his way to pick them up.

In some cases the basis employed for the commission system has not been satisfactory, because of the tendency for some drivers to bring in bottles to which they were not entitled or for some drivers to pool their interests. However, with proper supervision and a suitable basis, this should not be an important objection.

The driver may have an opportunity to pick up stray bottles which would not be collected by other drivers, and should be encouraged to do so, as these can be returned to the rightful owners through the exchange. He should not be allowed as much for stray bottles as for

bottles of his own company, however, as that may induce him to pick up stray bottles from places where the driver for the company to whom they belonged would normally take them.

At some plants no check was kept on the number of bottles returned by the drivers. The life of the bottle at such plants is bound to be short. At other plants where no commissions were paid, a careful check was kept on the number of bottles returned by each driver, and reduction of shortages was urged either by talks by the management or by posting the records of each driver on a bulletin board. At a few plants competitive prizes were offered for the highest percentage of bottle returns.

THE STORE BOTTLE

One of the greatest sources of loss of milk bottles is through the sale of milk to stores with no charge for the bottles. Often store customers throw the bottle into a refuse can, incinerator, or other receptacle for refuse and many bottles are never recovered. If the stores charge for the bottle, the customer will usually return it.

RESULTS OBTAINED FROM USE OF STORE BOTTLES

The effect on the life of the bottle of charging stores for the bottle is shown by the comparison for 32 plants that adopted this practice with 46 plants that did not (table 6). The 78 plants all belonged to milk-bottle exchanges. The data are also arranged to show the number of plants that paid the driver a commission on bottles returned.

TABLE 6.—*Effect on the average life of the bottle of charging stores for bottles and paying drivers a commission on returned bottles, at 78 plants belonging to milk-bottle exchanges*

Practice followed by plant	Charge made to stores for all bottles			No charge made to stores for bottles			Total		
	Plants	Trips made by bottle		Plants	Trips made by bottle		Plants	Trips made by bottle	
		Average	Range		Average	Range		Average	Range
Plants paying drivers a commission based on return of bottles	*Number* 13	*Number* 51.03	*Number* 37–64	*Number* 7	*Number* 28.29	*Number* 21–37	*Number* 20	*Number* 43.07	*Number* 21–64
Plants not paying drivers a commission on return of bottles	19	34.65	20–52.96	39	21.52	6–30.60	58	25.82	6–52.96
Total, average, or range	32	41.30	20–64	46	22.55	6–37	78	30.24	6–64

A longer average life was obtained at the plants that charged than at the plants that did not charge the stores for the bottles.

Experience shows that when a charge is made for bottles delivered to stores this loss is greatly reduced. In one city where this practice was adopted the number of bottles that were handled by the milk-bottle exchange was reduced by one-half. In another city after the practice was discontinued, one dealer who formerly bought only two carloads of bottles a week had to begin buying seven carloads a week. A dealer in another locality where its use was discontinued put 60 car-

loads of bottles into use in five months as compared with 30 carloads a year formerly. The business of this latter dealer was 30 percent wholesale, or store trade.

CHARGES MADE TO STORES FOR BOTTLES

The dealers in 46 cities with bottle exchanges charged the stores for all bottles delivered to them, according to reports from the exchanges. The prices charged to the stores were as follows:

Charge per bottle delivered to store:	*Number of cities*
1 cent	8
2 cents	7
3 cents	9
4 cents	0
5 cents	21
6 cents	1
Total	46

This indicates that 5 cents, which is the approximate cost of a quart bottle to the dealer, was charged for all bottles in nearly one-half of the cities from which reports were received. Different prices were charged to stores for different sized bottles in only three of these cities. In one city the charge for quarts was 5 cents and for pints and one-half pints 4 cents. In another city the dealers charged 5 cents for quarts and pints and 3 cents for one-half pints. In the third city, the dealers charged 3 cents for quarts and 2 cents for pints and one-half pints. Fourteen exchanges reported that a universal store bottle was used in their cities. For reasons stated later, if a universal store bottle is to be used, it is usually desirable to charge a lower price for the smaller bottles than for the quarts.

DOES BOTTLE DEPOSIT AT STORES CONSTITUTE A SALE?

Some exchanges have had some trouble in obtaining the bottles of their dealers because the latter have collected a deposit on bottles left at stores, and one exchange reported that the courts had held that a sale was involved where a deposit on bottles had been collected from stores.

In most States, however, the law specifically states that when a charge is made for store bottles this does not constitute a sale, as illustrated by the following quotations from the bottle laws of two States:

> Whenever the owner or owners of said containers * * * so marked or branded * * * shall require taking or accepting of any sum of money as a deposit for security for the safekeeping and return of such containers * * * it shall not constitute a sale of such containers * * * either optional or otherwise in any proceeding under this act.
>
> No person, firm, or corporation excepting the owner shall sell or offer for sale any can, bottle or * * * which has been once filled * * * provided, however, that the taking or accepting of a deposit as security for the return of any such bottle * * * shall not be deemed a sale of the same.

OTHER FACTORS RELATING TO USE OF STORE BOTTLES

If the same bottle is used for family as for store trade, and the stores are charged for the bottles, a ticket is given the store customer on paying for the milk and bottle. The store will return the deposit if the ticket is returned with the empty bottle, or the customer may

exchange the empty bottle for one full of milk, paying for the contents only and keeping the ticket until the rebate on the bottle is desired without buying more milk. This system works well, but involves the bother of taking care of and handling and counting the tickets.

Another system that works very satisfactorily is for all dealers in a city to use a "universal" store bottle, with no name on it, though usually the words "Store bottle" and the amount of the charge is stamped on it. No ticket is required, and the bottle is good for the amount stamped on it to whoever returns it to any dealer or to any milk store. The universal store bottle has the disadvantage that the individual dealer loses certain advertising privileges, as his name is not prominently shown and appears on the cap only.

The lack of company advertising on the universal store bottle is probably the most important argument against its use where a charge is made to stores for bottles, and only 14 exchanges reported its use by dealers in their cities. Of a total of 75 exchanges, 53 reported that some dealers in their cities carried advertising in the glass in addition to the owner's name.

The universal bottle, also, does not permit advertising the name of the dealer on bottles in applied color. Such bottles have an attractive appearance and cause the dealer's name to stand out boldly. That their use has become very popular is attested by the fact that 68 exchanges stated that bottles with applied color were used in their cities, and the average percentage of such bottles used, as given by 60 exchanges, was 41.74 percent, ranging from 1 to 90 percent. Only two exchanges reported that no bottles with applied color were used in their cities.

Many dealers use a special store bottle with their name stamped on it. This special bottle usually bears some distinctive marks or is of distinctive shape so that it can be readily distinguished from the bottles for the family trade. No ticket is required and the dealer will pay the amount charged for the bottle whenever it is returned.

Whether this type of bottle or a universal store bottle is used, it is very important that all store bottles at the plant be properly protected from theft, as they are good for the rebate to anyone who may present them. Also, they may occasionally be taken by children and others, but with proper supervision the trouble from this source should not be important.

In using a special store bottle, the same charge may be made for all sizes of bottles, as the dealer cannot redeem more than he sent out of each size unless he accepts other dealers' bottles, and these are identifiable. Where a universal store bottle is used, however, this may not work out satisfactorily. Since all bottles presented are redeemed, more of the smaller sizes (pint bottles and jars) and fewer of the quart bottles may be presented to a dealer for redemption than he put out. A pint bottle or jar costs less than a quart bottle, so the dealer who redeems more than his share of the smaller sized bottles loses by the transaction. For example, if he sends out a quart bottle that cost him approximately 5 cents, and receives in return and redeems for 5 cents a smaller bottle worth only about 3 cents, he loses 2 cents on every quart bottle exchanged for a smaller bottle. The remedy for this is to charge the store a price for each size of bottle that approximately covers its value.

The use of the store bottle virtually eliminates the cost of bottles to the dealer for his store trade, when the charge made for the bottles equals their cost.

Although the use of the store bottle is one of the most important factors in reducing the loss of bottles, and has met with complete success in many localities, its use has been considered unsatisfactory in a few localities and has been discontinued. Since there is usually no charge made for bottles used in the retail or family trade, the practice of charging the stores for bottles puts the retail business at a competitive disadvantage, because the family business must bear the cost of bottle losses while the store business is free from it. Moreover, as the strictly wholesale dealer who sells all his bottled milk to stores would have no bottle cost, he may decide to cut prices of milk to the stores. This will tend to increase the amount of milk sold through stores, which in turn decreases the loads carried on the retail routes and thus adds to the unit cost of retail delivery.

Also, in some localities where the store bottle is in use, stores which operate their own pasteurizing and bottling plants may sell the milk to customers at prices considerably lower than the regular retail delivered price. They have no loss on bottles, because a charge is made for them. In some cases they are not equipped and do not desire to handle all the milk that might be demanded at the reduced prices, but use the milk as a "leader." This, of course, tends to demoralize the market, and the fear of such practices has no doubt in some cases prevented the adoption of the store bottle by the milk dealers or been one cause of its discontinuance.

In spite of the disadvantages of the store bottle, its use has proved very satisfactory in many localities, and has been a major factor in increasing the life of the bottle.

COMPARATIVE USE OF THE SINGLE-SERVICE BOTTLE

To eliminate bottle expense due to the breakage and loss, as well as the collecting, washing, and sorting of the bottles, the single-service or paper bottle has been tried in various localities and is being used by some dealers for milk and other products, especially for the store trade. Data from 72 milk-bottle exchanges and from other sources indicated that single-service milk bottles are rather widely used. Single-service milk bottles were used by some milk dealers in six cities, according to reports from the exchanges, whereas 66 exchanges in as many cities reported that they were not being used by any dealers in their cities. Information received from other sources, however, indicated that some single-service bottles were used in 18 other cities by various dealers.

In the store trade the single-service bottle is found to be especially convenient for sale of milk to transient customers who may throw away or fail to return the bottle. The use of the single-service container for milk and other products, besides eliminating the loss of bottles, also eliminates the bother stores have with returned bottles, or with the bottle ticket or bottle records.

The single-service containers, as a rule, do not permit the customer to see the cream line or detect the presence of sediment in the milk. They also tend to lessen the appeal of advertising calling attention to the cream line.

A study made some years ago indicated that, if the glass bottle had an average life of not much less than 30 trips, its cost was considerably less than 1 cent, including the cost of the bottles and of washing them. Though many milk plants do not obtain 30 trips from the glass bottle under their present methods, as shown in this survey, a life of approximately 30 or more trips is obtained in well-managed plants where efficient methods and equipment are used to reduce breakage in the plant and losses on the routes. In some localities where no charge is made to stores for bottles only 8 or 10 trips are obtained from the store bottle, and under such conditions the paper container can easily compete with the glass bottle from the standpoint of cost alone.

Paper containers tend to reduce cost of delivery to stores, especially if they constitute the entire load, because they weigh less and occupy less space on the delivery truck than glass bottles.

THE MILK-BOTTLE EXCHANGE

In addition to the use of one or more of the foregoing methods of getting bottles in from the routes, a milk-bottle exchange may be operated. Most of the milk plants from which reports were received belonged to an exchange.

As indicated in table 4, the exchange is one of the most effective means of getting stray bottles returned to the owners and of increasing the life of the milk bottle. Stray bottles brought in by the route men are sent to the headquarters of the exchange where they are sorted, in many cases washed, and returned to the owners. In addition, large numbers of bottles salvaged from alleys, refuse cans, city dumps, etc., are brought to the exchange and returned by it to the owners. Besides collecting bottles and serving as a clearing house for lost bottles picked up, the most useful exchanges perform various other functions in relation to preventing loss of bottles.

ORGANIZING AND FINANCING

In general there have been three methods of establishing milk-bottle exchanges: By the dealers themselves, by private agencies or individuals, and by an association representing some of the dealers.

Reports were received from 78 exchanges of which 60 were owned and operated by the dealers.

The majority of the exchanges owned by dealers were incorporated under State laws, although a large proportion of them were nonstock corporations. Of the 60 exchanges owned by the dealers, 48 were incorporated. The average capitalization of 25 incorporated exchanges was $7,218, and ranged from $500 to $50,000. Twenty-three of the incorporated exchanges were nonstock corporations. Many of the latter charged a membership fee based on the number of wagons operated, and some charged their members monthly or annual dues. The following bases for distributing the stock to members were used by 22 capital-stock corporations:

	Number of exchanges
Number of wagons operated	14
One share to each member	3
Number of bottles handled	2
Gallons of milk handled	1
Equal number of shares for each member	1
One or more shares for each member, but no specified number	1

Apparently the most common practice for exchanges which are owned by the dealers is to incorporate, and when capital stock is issued, the most common basis used for the distribution of the stock is the number of wagons operated by the members.

Of the 18 private exchanges reporting, only 2 were incorporated, 1 with a capitalization of $5,000 and 1 of $10,000.

A few exchanges borrowed some money when organized to help them get started (12 out of 78), but this indebtedness was usually paid off in a short time.

The form used by one bottle exchange in signing up dealer members was essentially as follows:

Form for application of milk dealer for membership in the local bottle exchange

_____, _____,
City State

_____, 19__.
Date

I hereby make application for membership in the_____ Milk-Bottle Exchange, Inc. In consideration of the acceptance of this application by the bottle exchange, I agree to pay, as a membership fee, to the bottle exchange the sum of_____dollars, being the equivalent of ten dollars ($10.00) per route, 50 percent of which is tendered with this application and the remainder at the option of the board of trustees of the bottle exchange. Upon becoming a member I agree to abide by the code of regulations of the bottle exchange, governing the privileges and duties of members.

_____.
Milk dealer

Application accepted_____, 19__.
Approved by:

_____

_____

_____
Committee

Any dealer filling out and signing this application, becomes a member of the exchange on approval of a committee of three exchange members. At least two of the committee members should be dealers, and the third may be the manager or secretary of the bottle exchange.

COOPERATION OF DEALERS WITH THE EXCHANGE

A few exchanges were organized by a small proportion of the milk dealers and only a small proportion of the dealers are members, but the majority of the exchanges have as members the greater proportion of the dealers in the locality. In 59 milk-dealers' exchanges the number of members averaged 77.2 percent of all the dealers, and ranged from 4 to 100 percent.

As a rule the exchange will collect and return bottles to all dealers regardless of whether they are members of the exchange, and all the dealers in the city cooperate with the exchange. Of 59 milk-dealers' exchanges an average of 95.9 percent of all the dealers cooperated with the exchanges regardless of whether or not they were members. The range was from 50 to 100 percent of all the dealers in the locality.

FORMS OF AGREEMENTS

The exchange generally is operated on the basis of a written contract between it and the milk dealers. These contracts usually grant permission to the agents of the exchange to enter the plants of the dealers at any time during working hours or to inspect the delivery wagons on the streets for the purpose of checking whether stray bottles are being used and to claim any stray bottles and to make exchanges. The prices to be paid and received by the exchange for bottles, cans, etc., are usually stated in the agreement. One form for such a contract follows:

Form for contract between bottle exchange and milk dealer

Location_____ Date_____, 19__.

It is hereby agreed and authorized by the undersigned milk dealer that the agents of the milk-bottle exchange can enter upon the plant, delivery or place of business of the dealer for the purpose of exchange and check of bottles at his pleasure—only during business hours. The milk dealer shall pay the bottle exchange one and one-half (1½) cents per bottle for the return of the bottles collected belonging to the milk dealer and the bottle exchange shall pay the milk dealer one-half (½) cent per bottle for every bottle not belonging to the milk dealer and collected by the bottle exchange.

_____ _____
Manager of exchange

_____ _____
Witness or witnesses Milk dealer

The agreements also usually grant the exchange a power of attorney, authorizing it to traffic in the bottles of the dealer for the purpose of recovering lost, strayed, or stolen bottles, according to the regulations of the exchange or of the milk dealers' association. Sixty exchanges reported that such power of attorney was given by the dealers to the exchange, while 14 reported that this power was not given except in a verbal way in some cases. A typical form of agreement between member dealers which grants this power to the exchange is as follows:

Form of an agreement by milk dealers giving the bottle exchange power of attorney to recover lost or stray bottles

Date _____, 19__.

We, the undersigned retail milk dealers, of the local milk dealers' association, do hereby appoint the local milk-bottle exchange our true and lawful attorney to receive into its possession, wherever the same may be found, such of our bottles, cans, cases, boxes, and any other containers used by us in our business of buying and selling dairy products, and registered by us under the provisions of the State dairy regulations, or otherwise identified as belonging to us, as may be found in the hands of other dealers, or other sources, not our customers, or which may be lost or strayed. For each of such bottles, cases, etc., as are recovered by the bottle exchange, it is authorized to pay to the person from whom it recovers the same such sum as may be fixed from time to time by the milk dealers' association; and upon return of any said bottles, etc., to the owner, such sum as may be fixed from time to time by the local milk dealers' association. In no case shall the exchange dispose of milk bottles, cans, cases, boxes, or other containers except to the milk dealer in whose name they are registered, or to whom they are otherwise identified, as stated above, and shall not enter into a contract with any person or persons for the payment of any sum as compenstion to said person or persons for their services and labor in the recovery of any of our said property without the written consent of the secretary of the local milk dealers' association. This power of attorney is to remain in force until expressly revoked by us in writing.

Signed: _____
_____
_____
Milk dealers

In many localities the bottle exchange also has a similar written contract with nonmember dealers with whom it cooperates and by whom power of attorney is often granted to the exchange, to receive and recover lost milk bottles or other containers of these dealers, at the same or slightly higher rates than those for dealer members.

COLLECTING AND DISTRIBUTING THE BOTTLES

SOURCES AND NUMBERS RECEIVED

Milk-bottle exchanges collect bottles from various sources but by far the largest proportion are received from the milk dealers, whose route men pick up stray bottles on their routes.

Of 56 exchanges owned and operated by the milk dealers, the proportion of bottles received from member dealers averaged 76.54 and ranged from 20 to 100 percent, and the receipts from nonmember dealers averaged 9.81 percent, and ranged from none to 74.9 percent. All dealer-owned exchanges except 16 received some bottles from nonmember dealers.

Of 72 exchanges the number which reported that bottles were obtained also from sources other than milk dealers was as follows:

Source of bottles obtained by exchange:	*Number of exchanges*
City dump or incinerator	44
Junk dealers	36
Apartment houses, etc	16
Collectors or pickers	12
Other exchanges	5
Factories	4
Miscellaneous sources	11

The average percentages of bottles received from various sources as reported by 72 exchanges are shown in table 7.

TABLE 7.—*Sources of bottles received and percentage recovered from the different sources, by 72 milk-bottle exchanges*

Source	Bottles received		Source	Bottles received	
	Average	Range		Average	Range
	Percent	*Percent*		*Percent*	*Percent*
Member dealers	70.90	0–100	Apartment houses	0.30	0– 8
Nonmember dealers	14.25	0– 99	Factories	.10	0– 3
City dumps or incinerators	6.50	0– 50	Other sources	1.25	0–35
Junk dealers	4.90	0– 49			
Collectors	1.35	0– 30	Total	100.00	
Other exchanges	.45	0– 19			

An average of over 85 percent of all bottles collected by the 72 exchanges came from milk dealers. Many of the exchanges did not receive any bottles from city dumps (see fig. 1), junk dealers, and pickers, and the average percentages received from these sources by all the exchanges was very small. Some exchanges, however, received as high as 50 percent or more of the bottles from such sources. In some cities the exchanges have retrieved large numbers of milk bottles by paying collectors and pickers on an hourly basis to find them on the dumps and save them. It was unlawful for these workers to sell the bottles.

CRATES AND CANS

In addition to the bottles, most exchanges handle bottle crates and milk cans. Of 76 exchanges 62 reported that they handled cans and 68 that they handled bottle crates. Nine exchanges did not charge for

handling cans and 13 charged nothing for handling crates. In some cases where crates and cans were handled without charge, the same prices were paid for those turned in to the exchange as for those returned to the owner, while in other cases no charge was made either way. When a charge was made for handling crates and cans, the amount charged varied from 5 cents up, but the most common prices charged were 10 cents each for cans and for crates.

PLAIN BOTTLES AND BOTTLES OF UNKNOWN OWNERSHIP

A considerable number of plain bottles and of bottles from other cities find their way to milk-bottle exchanges. Where bottles belonging to dealers in neighboring cities which have a bottle exchange are received, the exchange usually cooperates with the other exchanges in returning the bottles to the owners. Twenty-six exchanges reported that they sold some bottles, the ownership of which was unknown, and 47 that they did not. Fifty exchanges reported that they sold some plain bottles that accumulated, while 23 reported that they handled none.

COLLECTING BOTTLES FROM APARTMENTS, CELLARS, ETC.

Residents of apartment houses often do not have a regular milkman and procure much of their supply from grocery stores. If no charge is made for the bottle, the consumer has no incentive to return it to the store. In some cases, even if the bottle is put out at the door the milkman who serves that floor of the apartment house will not pick up any bottle that belongs to another company. It is a common sight in many apartment houses to see milk bottles placed by the incinerator along with papers and other trash. Unless these bottles are picked up by a milkman or some arrangements are made with the janitor to save them, they are usually thrown into the incinerator along with the trash.

Reports from bottle exchanges as to methods used either by the exchange or the milk dealers to retrieve misplaced bottles from apartment houses are shown below:

	Number of exchanges reporting
Exchange picks up bottles on request of apartment house manager or tenant	10
Exchange makes periodical visits	6
Janitor paid a small amount to save the bottles	10
Janitor given milk for saving the bottles	2
Publicity by the exchange through the press and radio	6
Collected through pickers and junkmen	13
Bottle collars, hangers, or circulars used	3
Boy Scout supervised campaigns	1
Deposit required on all bottles	1
Route men charged for bottles short	1

Some exchanges reported that this was not a problem in their city, as there were few or no apartment houses.

Probably the best way to secure bottles from apartment houses when they are not put out for the route man is to get the cooperation of the tenants and the management, if possible, and deal with them directly. In many cases, however, it is considered necessary to deal directly with the janitors. It is usually necessary to pay the janitor a small fee for picking up and saving the bottles he finds in the apart-

ment house. The janitor's cooperation can generally be obtained by paying him a nominal flat amount or by giving him a quart of milk daily. If he is paid by the bottle, however, he may abuse the privilege by picking up bottles at the doors of apartments where the regular milkman would normally get them anyway.

Some exchanges have retrieved large numbers of bottles both from apartment houses and from private homes through radio announcements and notices in the press. Many milk dealers leave notices with their customers in the form of bottle hangers or circulars. These notices explain that the bottle is only loaned to the customer and stress the importance of returning the bottle or putting it out for the milkman. Below are shown samples of notices put out by exchanges and milk dealers:

> If I bring your breakfast will you return the platter?
> The milk bottle should only be used for the sanitary delivery of milk to the consumer.
> The bottle is only LOANED—NEVER SOLD.
> Please RETURN promptly—THANK YOU.

> THE MILK IS YOURS
> THE BOTTLE IS OURS
>
> During the past year we have failed to receive from customers thousands of empty bottles, representing tremendous increase in the cost of maintenance.
>
> It is for your protection therefore that every empty bottle is returned.
>
> Each bottle costs many times our actual profit on the milk.
>
> We believe you will be in full sympathy with our efforts to eliminate this loss and that we may count on your hearty cooperation in returning all empty bottles as promptly as possible.
>
> ----------
> Dairy company

Many exchanges in their advertisements in newspapers and on the radio try to encourage direct return of the bottles to the milk dealer. The following is such a notice put out by one exchange:

> If you are having milk delivered to your home * * * simply set out all surplus bottles * * * the salesman will gladly collect them whether they belong to his dairy or not. They will be returned to their proper owners and restored to active service * * * remember * * * while these bottles are of no value to you, they are of great value to your dealer.

Another advertisement is as follows:

> Last Call for Milk Bottles. Have we called for those at your home? If not, phone your dairyman immediately or the Bottle Exchange (giving phone number) for special collection service.

RETRIEVING BOTTLES FROM OTHER SOURCES

If the bottle is thrown into the incinerator of an apartment building or reaches the city incinerator, it may never be recovered. If it is thrown into a refuse can and goes out with the refuse from an

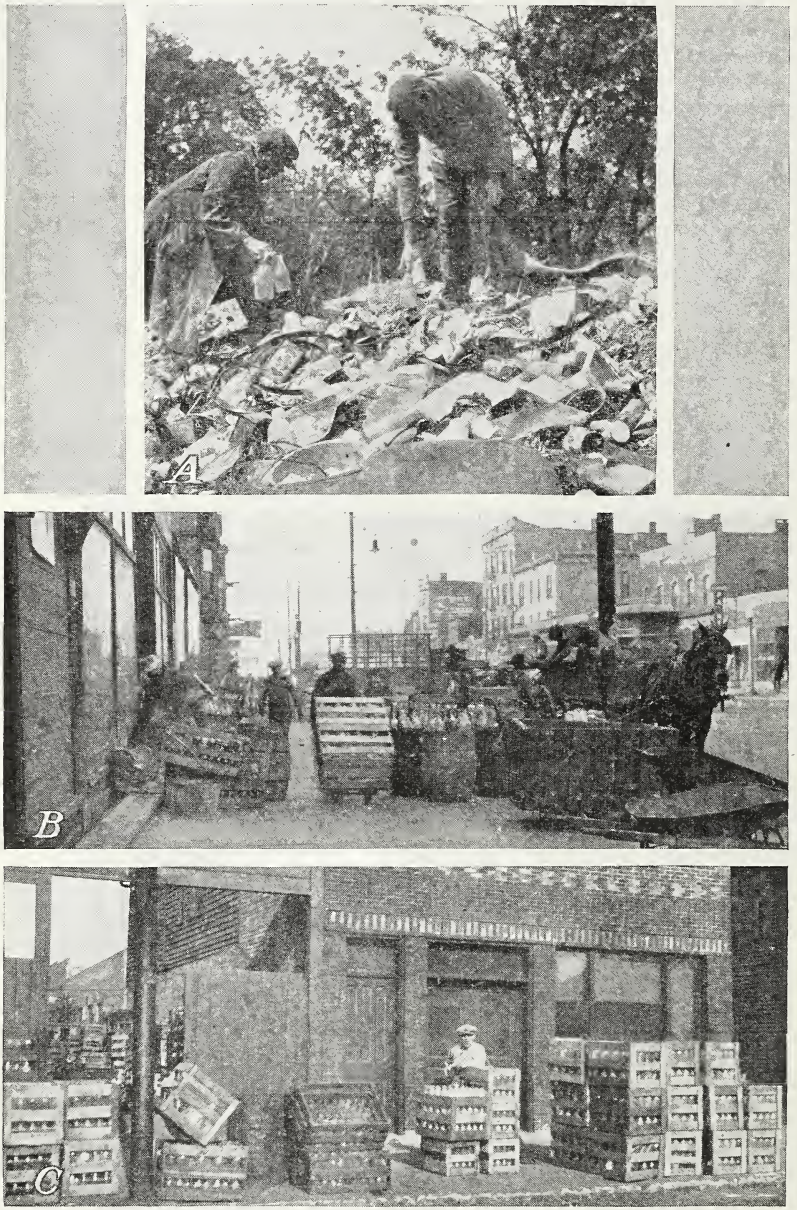

FIGURE 1.—*A*, "Pickers" collecting milk bottles from refuse pile; *B*, headquarters of a junk dealer and bottles being received from collectors and pickers; *C*, headquarters of junk dealer with crates of bottles ready for delivery to the local milk-bottle exchange. At 72 exchanges an average of only 4.9 percent of all bottles received came from junk dealers. Such bottles are washed and treated by the exchange and again by the milk dealer before being used.

apartment building or house, there is some chance of its being retrieved, especially if a milk-bottle exchange is operated. In many cities collectors visit alleys, etc., and pick up anything that has been discarded which may be of value. If they find stray milk bottles (fig. 1) they may sell them to a junk dealer, who in turn will sell them to the local milk-bottle exchange if one is operated. Large numbers of bottles go to the city dumps. Sometimes "pickers" or collectors are allowed to pick over the refuse at these dumps (fig. 2), and many milk bottles are retrieved and are usually sold to the bottle exchange, either directly or through junk dealers.

FIGURE 2.—*A*, Refuse pile at a large city dump, containing many milk bottles; *B*, city dump and incinerator, and barrels and boxes for salvaged milk bottles; *C*, crates of milk bottles salvaged from city dump, ready for delivery to the local milk-bottle exchange. At 72 exhanges an average of only 6.5 percent of all bottles received came from city dumps or incinerators. Such bottles are washed and treated by the exchange and again by the milk dealer before being used.

Large numbers of bottles are obtained by many exchanges through junk dealers. In many cities, however, junk dealers are prohibited from trafficking in milk bottles.

In some cities the exchange is able to exercise a certain supervision over the junk dealers, and if they do not live up to its rules it will not deal with them. As the collector's load of material usually includes a few milk bottles, and he desires to dispose of his entire load at one place, the junk dealer may lose his business if the milk bottles are not accepted with the other material. Hence the junk dealer usually tries to abide by the rules of the exchange regarding traffic in milk bottles so that he can continue to handle them.

Many exchanges deal with the junk dealers through a permit system with a written contract. Under such a system the junk dealer is prohibited from accepting bottles from children or picking them up from places where the regular milk route man would ordinarily pick them up, as at apartment houses or from janitors. If the junk dealer does not live up to the rules, the exchange will quit dealing with him and may take legal action to recover the milk bottles.

When an exchange has a contract with the junk dealers, it may prosecute one who attempts to sell milk bottles to anyone except the exchange.

Twenty-four exchanges stated that junk dealers were prohibited from trafficking in milk bottles in their cities by State or local law. Where such laws are in effect the exchange will not buy bottles from junk dealers, will check up on them from time to time and warn any dealer known to have milk bottles in his possession.

Only seven exchanges reported that some of the milk dealers would buy bottles from junkmen. This should be prohibited where there is a milk-bottle exchange, whether or not the exchange has a contract with the junk dealers.

Though there are some objections to permitting junkmen to traffic in milk bottles and this is prohibited in many cities, large numbers of bottles are salvaged through junkmen in other localities. This method works out fairly satisfactorily in many cases, provided the exchange can exercise some control to see that the junkmen live up to requirements. On the other hand, unless the exchange is large enough to maintain a force of inspectors to check on the junkmen, it is usually better not to deal with them. Thirty-four exchanges reported that they had no control over junk dealers. Many bottles have been shipped out of town by junk dealers. Exchanges, however, have been instrumental in many cases in preventing junk dealers from shipping bottles to another city or State. This problem has not yet been wholly solved, and one exchange manager estimated that such traffic in milk bottles between cities in his own and three neighboring States involved several million bottles annually.

TRUCKING, SORTING, AND WASHING OF BOTTLES BY EXCHANGES

Some exchanges neither pick up nor deliver bottles, but act merely as a clearing house for the milk dealers, who bring in the bottles that do not belong to them and take away their own. The bottles are sorted at the headquarters of the exchange and in some cases washed, and are then turned over to the milk dealers to whom they belong. Other exchanges operate a fleet of trucks and collect bottles from the dealers' plants or wherever they may be found, bring them to the

exchange, and then sort and haul them to the plants of the owners of the bottles. Of 59 bottle exchanges owned by milk dealers, 35 hauled all the bottles between the plants and the exchange, 3 trucked for the smaller dealers only, and 21 did no trucking. All except 2 of the 19 private exchanges trucked the bottles between the milk plants and the headquarters of the exchange. Fifteen of the milk-dealers' exchanges and six of the private exchanges transported some bottles direct between milk plants without taking them to the headquarters of the exchange. This will often save considerable rehandling where large quantities of stray bottles have accumulated and have been sorted at the milk plant. Seven exchanges reported that some bottles were trucked direct between milk plants by the dealers themselves.

Investments in trucks at various exchanges are shown in table 9. As stated elsewhere (p. 25), the trucking of the bottles by the exchange adds to the operating cost but is a part of the service the exchange renders. Two exchanges which did not have any equipment, had all the work of the exchange, including the trucking and the sorting of bottles, done by contract at 0.5 cent per bottle handled.

Bottles were washed at only 20 milk-dealers' and 7 private exchanges, and, of the 27 exchanges that washed bottles, 11 reported that only the very dirty bottles, such as those received from junk dealers and city dumps, were washed, the number varying from 2 to 25 percent.

The following methods of bottle washing were used:

Method of washing bottles by exchange:	*Number of exchanges*
Soaker-type machine	9
Power-driven brush washer	17
By hand	1

While many exchanges did not wash the bottles, most of the larger exchanges realized the importance of washing all bottles returned from city dumps, junk dealers, etc. Special methods have to be used on many of these bottles. At some exchanges where the soaker-type washer is used, bottles which do not come out clean the first time are sent through the machine again. Bottles that are not properly cleaned after going through the machine twice are usually discarded. Bottles which contain plaster, tar, cement, paint, etc., are sometimes treated with kerosene, muriatic acid, etc., then rinsed in a solution containing alkali and washed with a brush washer before being finally sent through the regular bottle-washing machine.

Some exchanges where bottles are not washed and none are received from junk dealers or city dumps require the milk dealers to wash the stray bottles at their plants before they send them to the exchange.

GLASS BROKEN BY EXCHANGES

As a rule only a small amount of bottle breakage occurs at milk-bottle exchanges. Forty-six exchanges reported an average breakage of 0.839 percent, ranging from 0.0005 to 5 percent.

Of 62 exchanges, 30 sent the cullet to a dump or gave it away, 31 sold the broken glass to glass manufacturers, brass foundries, etc., and 1 sold the breakage to junkmen. In some cases the exchange paid to have the broken glass hauled away. Unless the exchange is large or breaks an excessive number of bottles, not much revenue can be obtained from the cullet. Bottle manufacturers will usually pay from $4 to $6 per ton for this material but generally will not buy it in

quantities of less than 50,000 pounds or approximately a carload. Where cullet is sold it is necessary that it be clean and free from dirt or refuse material.

LABOR REQUIRED TO OPERATE MILK-BOTTLE EXCHANGES

PLANT EMPLOYEES

The number of men required to operate a milk-bottle exchange depends on the number of bottles handled, the arrangement of the plant, and whether the bottles are washed at the exchange. A large plant with conveniently arranged conveyors can handle more bottles per man than a small or a poorly arranged plant. Some plants are equipped with well-arranged conveying systems so that the bottles are sorted with minimum handling.

The number of plant employees at 66 exchanges ranged from 1 man part-time at a plant handling 52,000 bottles annually to 45 men at a plant handling 45,000,000 bottles annually. The average number of bottles handled annually per plant employee was 613,235 and ranged from 104,000 at a small plant where all the bottles were washed, to 2,750,000 at a large plant where none were washed.

The number of bottles handled per plant employee, classified on a basis of whether the bottles were washed at the exchange, is shown in table 8.

TABLE 8.—*Bottles handled annually per plant employee at 66 milk-bottle exchanges* [1]

Method of treatment	Plants	Bottles handled annually per plant		Bottles handled annually per plant employee	
		Average	Range	Average	Range
	Number	*Number*	*Number*	*Number*	*Number*
All bottles washed	13	4, 531, 692	52, 000–18, 000, 000	421, 077	104, 000–720, 000
Only junk bottles washed	11	7, 914, 688	312, 500–45, 000, 000	887, 346	208, 333–1, 643, 580
No bottles washed	42	1, 245, 297	85, 000–5, 500, 000	600, 922	110, 000–2, 750, 000
Total	66	3, 004, 182	52, 000–45, 000, 000	613, 235	104, 000–2, 750, 000

[1] Men in plant only; does not include truck drivers, inspectors, or office employees.

As a rule the plants in the group where junk bottles only were washed were much larger than those in either of the other two groups. Although the data in the table indicate that more bottles can usually be handled per plant employee if they are not washed by the exchange, they also show that the size of the plant is an important factor. Some extra labor is required for washing the bottles at all plants, but in a well-arranged large plant with conveniently arranged conveying systems the extra labor required for washing the bottles should not be great. In spite of the added expense for labor and for the investment and operation of the washers, it is desirable that all bottles be washed by the exchange if possible. It is especially important that all bottles received from junk dealers, city dumps, etc., be washed before they are returned to the milk plants.

INSPECTORS

Among 65 exchanges 34 had men designated as inspectors, and a few reported that the inspection work was done by the State. The number of inspectors varied from one man part time at an exchange handling

250,000 bottles annually, to four men each at exchanges handling 18,000,000 and 45,000,000 bottles annually. The principal duties of the inspectors are to make regular inspections of the wagons and premises of various milk dealers to prevent them using stray bottles and to check up on the manner in which junk dealers are living up to their agreements. They have numerous other duties, such as locating misplaced bottles wherever they may be. At some of the small exchanges inspection work is done by the manager. Below is shown a form used by the inspectors of one exchange in reporting investigation of the premises of milk dealers:

Form for reporting inspection of milk plants by inspector of the exchange

Date _____, 19__, time of day _____

Name of dealer _____. Place _____

Inspection made by _____, inspector.

Size of bottles	Own bottles	Stray bottles	Remarks
Quarts:	*Number*	*Number*	
Filled			Approximate number of own bottles in daily use _____ bottles.
Washed			
Pints:			Approximate number of stray bottles in daily use _____ bottles.
Filled			
Washed			
½ pints:			
Filled			
Washed			
Other sizes:			
Filled			
Washed			
Total:			
Number of bottles			
Percentage			
Cans or other containers.			

TRUCK DRIVERS

The number of truckmen at 44 exchanges varied from 1 man part-time at an exchange handling 52,000 bottles annually to 13 drivers with 13 helpers at an exchange handling 45,000,000 bottles annually. The number of men depended on the size of the exchange and whether it trucked the bottles from the dealers' plants to the exchange. However, where the milk dealers haul their stray bottles, the exchange may have one or two drivers to pick up bottles from other places. The average number of bottles handled by the exchanges per truck driver employed was 1,343,004, ranging from 104,000 to 5,000,000.

INVESTMENTS IN PLANT AND EQUIPMENT

The investments in building and equipment at 67 exchanges are shown in table 9. Many of the smaller exchanges rented quarters in which to sort the bottles and had very little equipment, whereas some of the larger exchanges had a considerable amount invested. At some of these plants elaborate systems of conveyors and sorting

tables eliminated much handling of bottles so that the work was done with a low labor cost. Only 19 exchanges owned any buildings. The investment in buildings at these exchanges ranged from $100 at an exchange handling 1,000,000 bottles annually to $42,000 at an exchange handling 18,000,000 bottles annually. Fifty exchanges rented space at a cost ranging from $5 to $450 a month. Thirty-three exchanges had an investment in plant equipment ranging from $25 at a plant handling 250,000 bottles annually to $45,058 at a plant handling 45,000,000 bottles annually. A few of the exchanges had some home-made equipment which was not charged as an investment and one exchange rented its equipment.

TABLE 9.—*Average investments in buildings and equipment and average operating cost at 67 milk-bottle exchanges*

Range in number of bottles handled annually	Total plants in group	Bottles handled per plant annually	Average operating cost per bottle handled	Buildings		Plant equipment		Trucks		Average monthly rental paid	
				Plants	Average investment	Plants	Average investment	Plants	Average investment	Plants	Average rental
	Number	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*	*Number*	*Dollars*
500,000 or less	19	265, 263	0. 0096	4	1, 675. 00	9	172. 22	13	608. 08	15	19. 33
500,001 to 1,000,000	19	728, 158	. 0055	5	3, 960. 00	7	163. 43	13	715. 00	15	26. 57
1,000,001 to 2,000,000	11	1, 636, 363	. 0067	3	4, 654. 66	4	711. 50	7	1, 135. 00	8	58. 12
2,000,001 to 5,000,000	10	3, 470, 000	. 0039	3	12, 448. 00	7	2, 607. 29	3	2, 160. 71	7	73. 57
5,000,001 to 10,000,000	4	6, 500, 000	. 0034	1	5, 017. 38	2	1, 099. 37	4	2, 681. 25	3	63. 33
Over 10,000,000	4	23, 000, 000	. 0047	3	16, 115. 71	4	14,187.43	3	14,429.50	2	275. 00
Total or average	67	2, 829, 477	. 0064	19	6, 903. 85	33	2, 507. 89	47	2, 006. 03	50	48. 17

Some of the exchanges that did not truck the bottles between the dealers' plants and the headquarters of the exchange had one or more trucks for picking up bottles at other places. The average investment in trucks at 47 exchanges ranged from $100 invested in 1 truck at an exchange handling 600,000 bottles annually, to $30,705.11 at an exchange handling 11,500,000 bottles annually. Five exchanges either rented trucks or had the trucking done by contract.

As a rule the investments increased as the number of bottles handled increased. Many of the plants, however, could handle considerably more bottles with no increase in equipment.

OPERATING COSTS

The average operating costs per bottle handled at the 67 exchanges is compared with the average investments in table 9, with the exchanges grouped according to number of bottles handled. The most common cost for all plants was 0.6 cent.

The range in operating costs per bottle handled for these exchanges is shown in table 10. At 40 exchanges the operating cost per bottle ranged between 0.3 and 0.6 cent, and at 21 exchanges the cost was above the latter figure. Only eight plants, however, had a cost of more than 1 cent and only six had a cost of less than 0.3 cent per bottle handled.

TABLE 10.—*Operating costs per bottle handled at 67 exchanges arranged according to number of bottles handled annually*

Range in number of bottles handled annually	Exchanges which trucked the bottles between milk plants and headquarters			Exchanges which did not truck the bottles between milk plants and headquarters			All exchanges		
	Plants	Operating cost per bottle handled		Plants	Operating cost per bottle handled		Plants	Operating cost per bottle handled	
		Average	Range		Average	Range		Average	Range
	Number	*Cents*	*Cents*	*Number*	*Cents*	*Cents*	*Number*	*Cents*	*Cents*
500,000 or less	13	1.17	0.46–3.17	6	0.50	0.24–0.67	19	0.96	0.24–3.17
500,001 to 1,000,000	12	.69	.30–1.55	7	.31	.14–.43	19	.55	.14–1.55
1,000,001 to 2,000,000	8	.76	.30–1.60	3	.43	.36–.50	11	.67	.30–1.60
2,000,001 to 5,000,000	7	.45	.32–.60	3	.25	.13–.33	10	.39	.13–.60
5,000,001 to 10,000,000	3	.34	.26–.42	1	.34		4	.34	.26–.42
Over 10,000,000	3	.52	.35–.69	1	.32		4	.47	.32–.69
Total, average, or range	46	.77	.26–3.17	21	.38	.13–.67	67	.64	.13–3.17

RELATION OF OPERATING COSTS PER BOTTLE TO TRUCKING AND WASHING OF BOTTLES BY EXCHANGE

Table 10 also shows the operating costs per bottle for the various sizes of exchange plants, according to whether the bottles were or were not trucked by the exchange between the milk plants and the exchange.

Where the bottles were trucked by the exchange, the average operating cost per bottle handled was slightly less than 0.5 cent at the larger exchanges and was between 0.5 and 1 cent at the smaller exchanges. The costs were also more uniform at the larger plants than at the smaller plants. The highest cost of all, 3.17 cents, was for a small plant in the first group which was handling only 85,000 bottles a year. This plant was operated at a loss and the members were assessed to make up the difference. Also some of the higher cost exchanges in the other groups were being operated at a loss and the members assessed to cover the loss.

The average operating cost for the exchanges that trucked the bottles was about double that of the plants that did not truck the bottles. The extra expense for trucking, however, apparently was not so great at the larger plants. For the plants handling over 2,000,000 bottles a year, the average operating cost at the plants which trucked the bottles was 0.44 cent as compared with 0.29 cent at the plants which did no trucking.

Trucking of the bottles from the dealers' plants to the exchange is usually a necessary function of the exchange and is a part of the service it renders.

Table 11 shows the relation washing the bottles by the exchange bears to the operating costs at the 67 exchanges, both for those that did and those that did not truck the bottles. There was not very much difference in the average cost between the two. The average cost at plants where all bottles were washed was 0.17 cent more per bottle than at the exchanges which did no bottle washing, hence this did not add greatly to the cost of operation at these exchanges. At the plants where only junk bottles were washed, the average operating cost was a trifle less than where no bottles were washed, but as a rule these were large plants.

TABLE 11.—*Relation of operating costs to certain operations at 67 milk-bottle exchanges classified as to trucking bottles*

Operations performed	Exchange trucks the bottles			Exchange does not truck the bottles			All exchanges		
	Plants	Cost of operation per bottle		Plants	Cost of operation per bottle		Plants	Cost of operation per bottle	
		Average	Range		Average	Range		Average	Range
	Number	*Cents*	*Cents*	*Number*	*Cents*	*Cents*	*Number*	*Cents*	*Cents*
All bottles washed	10	0.83	0.39–1.60	1	0.32		11	0.79	0.32–1.60
Only junk bottles washed	9	.65	.26–1.55	2	.32	0.30–0.34	11	.59	.26–1.55
No bottles washed	27	.78	.30–3.17	18	.39	.13–.67	45	.62	.13–3.17
Average or total	46	.77	.26–3.17	21	.38	.13–.67	67	.64	.13–3.17

AMOUNTS PAID AND CHARGED PER BOTTLE AND SPREADS TAKEN BY EXCHANGES

In order to make the exchange self-supporting, when owned by the dealers, or to make a slight profit when privately owned, usually prices paid by the exchanges for bottles turned in are less than those charged the dealers for bottles returned. The amounts paid per bottle for bottles received from various sources, the amounts charged per bottle for bottles turned over to members and nonmember dealers, and the spread taken by the exchange, are shown in table 12 for 56 exchanges owned and operated by milk dealers.

TABLE 12.—*Prices paid and charged per bottle and spreads taken by 56 exchanges operated by milk dealers*

Item	Exchanges	Average	Range	Median	Most common
	Number	*Cents*	*Cents*	*Cents*	*Cents*
Prices paid per bottle to—					
Members	56	1.01	0 –5	1	1
Nonmembers	51	1.10	0 –5	1	0.5 and 1
Junk dealers	44	.91	.33–2.5	1	1
Prices charged per bottle by exchange to—					
Members	56	1.88	.67–5.33	1.5	1.5
Nonmembers	49	2.42	1 –5.33	2	1.5
Spread taken by exchange for—					
Members	56	.86	0 –3	.63	.5
Nonmembers	49	1.33	2.5 –4.5	1	1

The prices paid for bottles of all sizes at any one exchange were usually the same, but in a few cases different prices were paid for different sizes. This was also true of the amount charged for different sized bottles. In a few cases the prices varied according to the number of bottles handled per month by the exchange; also, if the bottles picked up and turned in by the dealer were sorted by the dealer before they were sent to the exchange, reduced rates were charged. In such cases an attempt was made in preparing the data in table 12 to find the average price paid and charged.

In two exchanges, nonmember dealers were paid for all bottles turned in by them, but their own bottles were not handled by the exchange.

Five exchanges did not pay anything for bottles turned in by members, and four of these did not pay anything for bottles received from nonmembers. If the dealers trucked the bottles to the exchange, however, usually 0.25 cent per bottle was paid the dealer to cover cost of haulage. These exchanges considered it the best policy not to pay dealers for bottles turned in, and to pay for the operation of the exchange from the amounts collected from the milk dealers for bottles returned to them. The advantages claimed for this system are that it simplifies bookkeeping somewhat, and also tends to discourage some dealers from collecting stray bottles that might otherwise be collected by the company to whom they belong.

Nearly all the exchanges, however, regarded it as best to pay a limited sum, amounting to a fraction of the value of the bottle, to encourage dealers to collect bottles that might otherwise not be picked up. Too high a price encourages taking of bottles and too low a price tends to discourage the bringing in of stray bottles.

Some exchanges do not pay for bottles brought in by dealers in excess of those taken out, especially to a dealer who constantly brings in more strays than he receives of his own bottles. Usually in such cases the extra bottles brought in are credited by the exchange to take care of any shortages that he may have in the future. One exchange paid member dealers the same price for bottles turned in as it charged for bottles returned to them. This exchange collected 0.5 cent per bottle margin from nonmembers, paying them 1 cent per bottle and charging them 1.5 cents per bottle.

As a general rule, the prices paid by the exchanges for bottles turned in by member and nonmember dealers did not differ very much, but the prices charged to nonmember dealers were in many cases slightly higher than those charged to member dealers for bottles returned to them. It will be noted that the average spread taken by the exchanges was less than 0.9 cent for member dealers and 1.33 cents for nonmember dealers. The most common spreads taken were 0.5 cent for member dealers and 1 cent for nonmember dealers.

Of 16 private exchanges, 9 took a spread of 1 cent, 5 took a spread of 0.5 cent, and 2 a spread of 1.5 cents per bottle. The prices paid for bottles by private exchanges ranged from 0.5 cent to 2 cents, and the prices charged ranged from 1 cent to 2.5 cents per bottle. Two private exchanges did not operate on a per-bottle basis, one of these being paid by the dealers at the rate of $3 monthly per route operated by the dealer, and the other exchange received a flat amount per month apportioned according to the number of bottles returned to each dealer.

RELATION OF SPREADS TAKEN TO TRUCKING AND BOTTLE WASHING BY EXCHANGE

Thirty-two milk-dealers' exchanges which trucked the bottles for their members took an average spread for bottles from member dealers of about 1 cent, while 26 which did not truck the bottles for members took an average spread from member dealers of about 0.66 cent per bottle. Fourteen private exchanges which trucked the bottles for the dealers took an average spread of about 1 cent per bottle, while two which did not truck the bottles took an average spread of 0.75 cent per bottle.

Ten milk-dealers' exchanges which washed all bottles took an average spread from member dealers of over 1.2 cents per bottle, while 37 which did not wash the bottles took an average spread from their member dealers of 0.8 cent, and 7 exchanges which washed the junk bottles only took an average spread of about 0.5 cent per bottle. Five private exchanges which washed all bottles took an average spread of 1.3 cents per bottle, nine which washed no bottles took an average spread of 0.9 cent per bottle, and three which washed the junk bottles took an average spread of 1 cent per bottle.

DISPOSAL OF PROFIT OVER EXPENSES

Although milk-bottle exchanges are not, as a rule, organized and operated for profit, most of them being owned and operated by the dealers, many exchanges do make a slight gain on their transactions. Of 70 exchanges, 52 reported that the income slightly exceeded expenses, and 18 that no profit was made. Two exchanges reported that members were assessed to cover losses.

The difference between the prices received and paid per bottle required to cover operating expenses, as reported by 53 exchanges, averaged 0.75 cent, and ranged from 0.25 cent to 3.25 cents, and the most common spread required was 0.5 cent per bottle.

Whenever a profit is made by the exchange it is usually returned to the member dealers in the form of rebates or dividends or the spread is temporarily reduced. The following methods of disposing of any excess over expenses were reported:

Method used by exchange for disposal of profits:	*Number of exchanges*
Contributions to advertising campaigns to increase consumption of milk	24
Spread reduced	21
Rebate to members on basis of business done with exchange	14
Added to surplus	[1] 10
Dividends on capital stock	[2] 8
Used for advertising campaigns for return of bottles	4
Used for a new building	1
Used for a new bottle washer	1

[1] 3 of these were private exchanges.
[2] 4 of these were private exchanges.

The contributions to campaigns for increasing milk consumption or stimulating return of bottles were a part of the regular activities of some of these exchanges, and the funds so contributed cannot be considered strictly as disposal of profits.

ADVERTISING CAMPAIGNS TO INCREASE THE CONSUMPTION OF MILK

The dairy industry has in recent years given much attention to educating the public as to the value of milk as a food and its importance in the diet of both children and adults. Publicity along this line has been an important factor in increasing the sales of milk and other dairy products. It is possible that one of the most satisfactory methods of financing such publicity campaigns would be through the milk-bottle exchange. With such a system of financing each distributor would contribute his share of the expense in proportion to the

number of bottles he handled through the exchange. Since many exchanges have a small surplus of receipts over expenditures, a considerable surplus could be built for this purpose by slightly increasing the spread. Several exchanges are already supporting campaigns along this line, either as a part of their regular activities or as a method of disposing of any surplus funds. Of 78 exchanges 24 reported that some of the funds collected were used for this purpose. In some cases the exchange itself did the advertising, and in others the exchange cooperated with and contributed funds to agencies already established for the purpose of carrying on milk-publicity campaigns.

While the primary purpose of a milk-bottle exchange is to have misplaced bottles returned to the owners and to reduce the loss of bottles, funds that are expended by the exchange for advertising milk and dairy products should benefit all of them, and any small increase in spread taken by the exchange that might be necessary to finance these activities would be equitably divided among them.

RECORDS KEPT BY EXCHANGES

The accounting records that must be kept by bottle exchanges should be as simple as possible. The following forms illustrate a few used for delivery and receipt of bottles by some exchanges. The receipts for bottles delivered to and received from the exchange are summarized at the end of the month in a monthly statement.

Form of receipt for bottles and crates delivered to exchange

Date _____, 19__
Received from _____, milk dealer
_____ Bottles @ _____¢ _____ $_____
_____ Crates @ _____¢ _____ $_____
_____ @ _____¢ _____ $_____
Total _____ $_____
_____
The Milk-Bottle Exchange

Form of receipt for bottles and crates delivered to dealer

Date _____, 19__
Received from _____ Exchange
_____ Bottles @ _____¢ _____ $_____
_____ Crates @ _____¢ _____ $_____
_____ @ _____¢ _____ $_____
Total _____ $_____
_____
Milk dealer

Form of monthly statement for bottles delivered to and received from dealer

_____, _____, 19__.
(City, State) (Month, day)

To _____
(Name of milk dealer)

_____
(Address of dealer)

In account with The Milk-Bottle Exchange, Inc.

Date	Bottles	Crates	Crate debit	Bottle debit	Date	Bottles	Crates	Crate credit	Bottle credit
	Number	*Number*				*Number*	*Number*		

Another form to show daily charges and credits is as follows:

Form of statement showing both amounts credited and charged to milk dealer

Date _____, 19__.

The _____ Milk-Bottle Exchange

To _____, milk dealer.

Quantity	Outbound charge	Price	Amount	Total
	Bottles, quarts			
	Bottles, pints, ½-pints			
	Cases			
	Cans			
	Total charge			

Quantity	Inbound credit	Price	Amount	Total
	Bottles, quarts			
	Bottles, pints, ½-pints			
	Cases			
	Cans			
	Total credit			
	Amount due			

Received by _____.
Checked and delivered by _____.
Time _____ o'clock.

PREVENTION OF MISUSE OF MILK BOTTLES, CANS, AND CRATES

The scope of this study did not include an extensive search of the multitude of city and State regulations governing the use and the misuse of milk bottles or other containers. Much of the following information was contributed by milk-bottle exchanges, which in most localities where an exchange is operated, serve as the agent of the milk dealers in seeing that the municipal or State regulations concerning milk bottles are enforced.

Of 78 exchanges, located in as many cities widely distributed in more than half of the States, only 7 reported that there was no local ordinance or State law regarding the use or misuse of milk bottles. In a majority of cases, the exchanges operated under a State bottle law.

Most of these laws provide for registration by the dealer, through the secretary of state or other appropriate State official, of the dealer's own brand or mark on all milk bottles, crates, cans, or other containers. In most cases milk bottles or other containers of milk must bear the owner's name, and dealers are prohibited from using any but their own bottles, crates, or cans. The law also usually provides that milk bottles, cans, or crates shall be used only for milk or other dairy products. Many of the laws also prohibit junk dealers, janitors, young boys, etc., from trafficking in milk containers.

REGISTRATION OF CONTAINERS

In most cases the bottle must be registered in order to be protected by the law. Only 10 exchanges reported that this was not necessary. For example, the dairy regulations of one State provide that—

> Any person engaged in the manufacturing, bottling, or selling of milk, buttermilk, cream or ice cream in any kind of receptacle having the name of such person or other mark or device printed * * * or otherwise permanently fixed upon the same may file in the office of the secretary of state for record a description of the name, mark, or device so used; and cause such description to be printed once each week for 3 successive weeks in a newspaper in the county in which the principal place of business of such person is located. It shall be the duty of the secretary of state to issue to the person so filing for record a description of such name, mark, or device in his office, to duly attest a certificate of the record of the same for which he shall receive the fee prescribed by statute for the issuance of certificates. In all prosecutions under this article such certificate shall be *prima facie* evidence of the adoption and ownership of such name, mark, or device and of the right of the person named therein to adopt and use the same.

Application for the registering of milk bottles or other containers may be made on the following form, similar to that specified in one State:

Form of application for registration of containers brand

Date _____, 19__.

To the State department of agriculture:

Application is hereby made to register the following word, words, mark, or device, in accordance with the State dairy law:

_____

_____

_____

The above mentioned word, words, mark or device is to appear on all containers in which our product is packed or dispensed. This is now being advertised in a local paper as evidenced by the attached clipping as required by law. Registration fee in the amount of $5 is enclosed for each brand desired registered.

Location _____ Name of firm or association _____

Name of owner _____

Usually to conform with the State requirements, notice of application for a brand or mark must be published in a local newspaper. Though no special form is required, a notice similar to the following is often used:

> Notice is hereby given by undersigned dealer (or association) that application for the following described (or illustrated) container's brand as provided by the State dairy regulations has been filed with the State department of agriculture:
>
> _____
>
> _____
>
> _____
>
> It is intended that said brand will appear on all milk, buttermilk, cream, or ice-cream containers owned by me/us and all containers so branded must not be used without my/our written permission.
>
> Signed _____
>
> (Dealer or association)

POSSESSION OR USE OF CONTAINERS

Most of the State bottle laws specify that no other person than the owner may retain or fill any registered milk container. The following statements paraphrased from State laws illustrate this point:

> Any person having in his possession or under control any receptacle bearing any name, mark, or device registered under the State law and not holding a written transfer or bill of sale therefor from the person named in the certificate of registration or other authority in writing from such person shall on demand deliver such receptacle to the owner or his authorized agent, and failure or refusal to do so shall be a misdemeanor.

> It is unlawful for any person, corporation, partnership, or association to use, in the sale, exchange, or delivery of milk or cream or their products, or any other products, any bottle, jar, can, or other container of another, upon which is stamped, blown, or engraved the name, title, or mark of the owner.

> It shall be unlawful for any person other than the one named in the certificate of registration without the written consent of the latter, to fill any receptacle bearing the registered name, mark, or device, with milk, buttermilk, cream, ice cream, or any other substance, or to deface * * * remove, or conceal any such name, mark, or device on any such receptacle, or to buy sell, give, take, destroy, dispose of in any way, traffic in or destroy any receptacle bearing any such name, mark, or device.

Twenty-three exchanges reported that it was illegal in their localities for dealers to grant other dealers the privilege of distributing milk or cream in their bottles, and 42 exchanges reported that this was permissible. As a rule this privilege is prohibited except by written consent of the owner, and is granted only when he sells his business to another dealer. The following abstract from a State regulation illustrates the general wording of laws in regard to assignment of containers:

> Any person, firm, or corporation, having complied with (the registration section of the State dairy act) may assign by sale or otherwise, such name, mark, or device to another person, firm, or corporation and the said assignee shall have all the rights and immunities and obligations conferred by this Act upon the original seller in relation to said bottles, cans, boxes, and other containers: *Provided*, That such assignee shall file in the office of the secretary of state and also in the office of the clerk of the county in which his or its principal place of business is situated a certificate of said assignment and cause such certificate to be printed once each week for 3 weeks successively in a newspaper published in such county.

Chocolate drink and orange drink that is bottled and distributed by milk dealers and others cannot be sold in milk bottles in some localities. Six exchanges stated that in their cities chocolate drink had to be sold in a special bottle, and 66 reported that milk bottles could be used as containers for it. In 32 of these cities fruit jucies could not be bottled in milk bottles, but in 42 a special bottle was not required, according to the milk-bottle exchanges. If a special bottle is not required, a special cap, usually colored brown, is often used for chocolate drink put in milk bottles, and a special cap colored orange may be used for orange drink. To distinguish containers for orange drink still further from the milk bottle, single-service containers may sometimes be used, even where a special bottle is not required by law.

TRAFFICKING IN CONTAINERS

As stated elsewhere (p. 20) trafficking in milk bottles and cans by junk dealers or others is often prohibited. The following quotations from State laws illustrate this point:

> No person shall without the consent of the owner, take, detain, use, buy, sell, traffic in or otherwise dispose of any registered can, tub, or cabinet. Possession of any such can, tub, or cabinet by a person in the transaction of his business shall be *prima facie* evidence of violation of this section.

> It is hereby declared to be unlawful for any person * * * other than the manufacturer, bottler, distributor, or dealer * * * to buy, sell, offer for sale, take, give, receive, handle in the course of business except when containing the liquid therein placed by the owner, bottler, or manufacturer, hire, rent, lend, transport, carry in wagons, carts, push-carts, or other vehicles, or to take or collect from ash or garbage receptacles, from public or private dumps * * * or deal or traffic in the same * * * without the consent of said manufacturer, bottler, distributor, or dealer, respectively whose name, mark, or device or other designation of ownership shall be therein or thereon.

ABUSE OF CONTAINERS

In regard to the abuse of milk containers, some State laws provide that anyone who puts an unclean or foul substance into any milk container shall be subject to a fine. In respect to milk containers, any substance deleterious to foods is an unclean substance, such as kerosene, paint, or turpentine.

As illustrated in State laws mentioned previously, many of the laws state specifically that it is unlawful to destroy any registered container, and any person, firm, or corporation who does destroy, secrete, or withhold the bottles, cans, or cases belonging to another dealer shall be liable to damages and fine or imprisonment.

ENFORCEMENT OF THE BOTTLE LAWS

In most cases the exchange as the representative of the milk dealers is responsible for enforcing the bottle laws. In some cases other agencies enforce the law, either independently or in cooperation with the exchange. In such cases the outside enforcement agent is usually some State agency, as the State department of agriculture or of markets.

Seventy-four exchanges reported that the following agencies were responsible for enforcing the bottle laws:

Enforcement agency:	*Number of exchanges*
The exchange	51
State departments of agriculture or markets, State dairy departments, or State department of health	16
State department of milk control	2
Local police	2
Milk dealers	1
City health department	1
City health department and State department of agriculture	1

In many cases the exchange cooperates with the local police and the State authorities in the enforcement of the bottle law.

In only one city was the local health department made responsible for enforcing the bottle law, and in one other city the local health department and the State department of agriculture cooperated in such enforcement. As a rule it is not desirable to make the local health department responsible for enforcing the bottle law. This law is not a health measure, and its enforcement by the local health department will tend to detract from the cooperative relations that should exist between the health department and the milk dealers.

Many exchanges reported that they had very little difficulty in enforcing the law, and no prosecutions had ever been necessary. Thirty-nine exchanges reported that sometimes warnings are not sufficient. The number of court cases reported by these exchanges varied greatly but averaged about 10 per year. In most cases convictions were obtained. Usually legal steps are taken only as a last resort. The legal grounds on which prosecutions were usually made were violation of State or local laws in the illegal use of registered containers and the violation of property rights.

SEARCH WARRANTS

Usually when the inspectors of the exchange find that bottles are being misused and the person using them refuses to give them up, it is necessary for the exchange to cooperate with the local police in obtaining possession of such bottles, and a search warrant must be obtained. The following is quoted from the bottle law of one State:

> Whenever any person who has filed for record any such name, mark, or device * * * shall make oath before any justice of the peace or police judge that he has reason to believe and does believe that any receptacle bearing such name, mark, or device is being unlawfully used or filled or had in possession by any other person, such justice of the peace or police judge shall thereupon issue a search warrant to discover and obtain such receptacle, and may also cause the person in whose possession such receptacle shall be found to be brought before him and shall then inquire into the circumstances of such possession and if it shall be found that such person is guilty of violation of any section of this article he shall be punished in the manner herein prescribed, and the possession of the property taken upon such warrant shall be awarded to the owner thereof * * *

An application for a search warrant is made before a justice of the peace or other duly authorized official, stating that some of the bottles or other containers belonging to a milk dealer are believed to be unlawfully used or held by a milk dealer or person other than the owner, and requesting a warrant to search the other dealer's plants and wagons. This application may be made out by the company owning the bottles or the exchange as the agent of the dealer.

The search warrant grants the dealer who owns the bottles, or his authorized representative, in company with the proper officer to enter and search any building, plant, truck, or wagon, of the milk dealer or other person alleged to have such bottles and seize any that may be found and arrest the persons in whose possession they were found.

The following forms illustrate the use of the search warrant with the application for same as used in one State:

Form of application for search warrant for milk containers

_____, 19__.

Commonwealth of _____, county of _____:

Before me the subscriber a(n) (justice of the peace) (alderman), in and for said State and County, personally appeared _____ who, being duly sworn according to law, doth depose and say that he has reason to believe and does believe that certain of the bottles, or other containers, the property of _____ who has complied with the provisions of the act of _____, are being unlawfully used, filled, or trafficked in, retained or destroyed or possessed by _____ being a person, firm, or corporation engaged in manufacturing or selling milk, and that said bottles or other containers in his, her, their or its possession are secreted in premises properly described as follows: _____

_____

Wherefore he respectfully prays that a search warrant may be issued to search the before mentioned premises in accordance with the provisions of the aforesaid act.

_____

Form of search warrant for milk containers

COMMONWEALTH OF_____,

_____*County, ss:*

The Commonwealth of_____, to_____, constable and assistants, agents, and deputies, acting under him.

GREETINGS: Whereas, complaint has this day been made before the undersigned, a justice of the peace (or alderman) in and for said county, by_____ _____, alleging that there is probable cause for belief, and that said complainant has just and reasonable grounds for believing, and it is believed that milk bottles and/or boxes and/or cans on which is branded, stamped, engraved, etched, blown or impressed, the names, marks or devices of the owners thereof, which names, marks or devices have been registered by the owners thereof in accordance with the act of_____, are being unlawfully used, filled or trafficked in, retained, or destroyed or possessed, in and upon that certain place, room, house, building, plant, truck, wagon, used and/or occupied by and in possession of_____as a milk plant, or vehicle for the transportation of milk and cream, and used in whole or in part for such business purposes, situate in the city, borough, or township of_____, county and State aforesaid, the said premises, truck or wagon, being more fully described as follows: _____

_____

And now, it appearing to the undersigned that there is probable cause for such belief, and I being so satisfied that probable cause exists, there are, therefore, to command you, by day or by night, to enter the aforesaid premises, place or thing and then and there to make diligent search for the above described milk bottles, and/or boxes, and/or cans, and if any such be there found, to seize and take the same and to bring before me the person or persons in whose possession such may be, and to make return of this warrant before me forthwith upon its execution, and, in any event, within ten (10) days from the date thereof, together with the thing and things so seized and taken for disposition according to law.

Witness our said justice of the peace at_____, who hath hereto affixed his hand and official seal this_____day of_____, A. D. 193__.

_____

Justice of the Peace

SUMMARY AND CONCLUSIONS

Data were obtained on the life of the bottle in 111 milk plants and on the methods used to get the bottles returned. Most of these plants were members of milk-bottle exchanges.

At these plants, the average life of the bottle was a little less than 35 trips. It ranged from 6 to 91 trips, and the most common range was between 20 and 30 trips.

The life of the bottle by sizes was reported by 54 plants. There was little difference in the averages for the quarts and for the smaller sizes, although more quarts are broken in the milk plants than bottles of the smaller sizes.

At 10 plants where no special system was used to have the bottles returned and no exchange was operated, the life of the bottle averaged only 22.58 trips.

The average for 78 plants in localities where an exchange was operated and which were members of the exchange was 30.24 trips.

The average for 6 plants where bottles were pooled and stray bottles were used was 47.32 trips.

The average for 17 plants where all bottles were charged to the driver, and bottles also pooled in many cases, was 57.13 trips.

At 20 plants where the driver was paid a commission on all bottles returned, an average of 43.07 trips per bottle was obtained, as compared with 25.82 trips for 58 plants that did not use the commission system.

At 32 plants that charged the stores for bottles, the bottle lasted 41.30 trips as compared with 22.55 trips for 46 plants that did not use a store bottle.

Very good results were obtained at 13 plants that paid the drivers a commission for returned bottles, charged the stores for bottles, and were members of an exchange also. The average life of the bottle at these plants was 51.03 trips.

Data were obtained from a total of 78 milk-bottle exchanges, of which 65 gave an estimate of the life of the bottle in their cities. When these were grouped on a basis of the use of a store bottle, an average of 21.74 trips was obtained in 31 cities where the store bottle was not being used and 38.15 trips in 34 cities where it was, according to the reports of the exchanges. All but 2 of the 65 exchanges reported that the life of the bottle had been definitely increased by the exchange, the estimated increase ranging from 5 to 100 percent.

Of 78 exchanges, 18 were privately owned and 60 owned by dealers. The majority of the exchanges were incorporated under State laws. The average investment in buildings at 19 exchanges which owned buildings was about $6,900. Equipment, for 33 plants, averaged about $2,500, and trucks, for 47 plants, about $2,000. Investments, however, ranged from less than $1,000 in small plants handling under 500,000 bottles, up to $50,000 in the larger plants, handling over 10,000,000 bottles a year.

The operating cost for 67 exchanges ranged from 0.13 to 3.17 cents per bottle, and averaged 0.64 cent. It was a little higher for the exchanges that trucked and washed the bottles than for those that did not. It was less at the larger than at the smaller exchanges as a rule. The number of men employed ranged from 1 man employed part time to 45 men at a large exchange.

The spread or difference in amount paid and charged per bottle by milk-dealers' exchanges averaged 0.86 cent for members, and ranged from nothing to 3.0 cents per bottle. Most of the exchanges are not intentionally operated at a profit, and the income over expenses was usually expended by the dealer-owned exchanges in efforts to

reduce bottle losses and in advertising to increase consumption of milk.

Junk dealers, collectors, or pickers recover many milk bottles from city dumps, alleys, etc., in some cities. In many localities, however, junkmen are forbidden by law to traffic in milk bottles. Where junkmen are allowed to collect bottles, the exchange often is able to supervise this method of collection.

In many municipalities State or local regulations forbid misuse of milk bottles or other milk containers, and tend to reduce theft and breakage.

The following observations on the results of this study appear to be justified:

Instruction of the consumer is too often neglected. Many consumers who throw away milk bottles do not realize the bottle has value and belongs to the milk dealer. Education of the consumer through circulars and other advertising matter, and through personal appeal by the driver to customers that do not put out the bottles, is very important. This must be tactfully done, however, to avoid offending the customers.

Although the systems of pooling the bottles and charging the driver for all bottles taken out have been an important factor in increasing the life of the bottle in some localities, they cannot be recommended for use in all. In many it would be necessary to get local regulations suspended which prevent dealers from pooling the bottles. Also, all dealers in the locality must cooperate in the pooling plan. However, where this system is used a bottle exchange is not necessary.

The systems that are most widely used and have the fewest disadvantages are: Paying retail route men a commission for return of bottles; making a charge for all bottles delivered to stores at a price commensurate with their value; and the establishment of a milk-bottle exchange.

Paying the drivers a commission on return of bottles gives them an incentive to pick up all bottles possible, and to remind customers to put them out for collection. The commission paid should be sufficient to encourage the driver to do these things but not so high as to tempt him to pick up bottles set out for other drivers.

If a charge is made for all bottles delivered to stores, the source of the greatest loss of bottles is virtually eliminated. The customers will be careful to return the bottles, if charged for them.

An efficiently operated exchange will aid in preventing the misuse of milk bottles, and will return at small cost per bottle large numbers of them that have gone astray. The most efficient exchanges truck the bottles to and from the exchange, wash the bottles, especially those from junk dealers or city dumps, before returning them to the dealers, and pay special attention to getting bottles from apartment houses, etc., and in instructing consumers to return them. The exchange should have the hearty cooperation of the dealers in the locality, whether members or not, and should have sufficient authority to perform its duties effectively.

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